

THE FOLLOWING IS THE ENGLISH TRANSLATION OF THE  
AMENDMENTS TO THE CLAIMS OF THE INTERNATIONAL  
APPLICATION UNDER PCT ARTICLE 19:  
AMENDED SHEETS (Pages 19-26).

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Amendment made under the treaty 19

Replacement Page

**CLAIMS**

[1] (amended) A compressor for compressing air applied to a jet engine, the compressor characterized by comprising:

- 5       a titanium compressor case composed of a titanium alloy;  
      a compressor rotor arranged inside the compressor case, the compressor rotor including plural titanium rotor blades at even intervals and being rotatable around a case axial center of the titanium compressor case,
- 10       wherein each of the titanium rotor blades includes;  
      a rotor blade main body composed of a titanium alloy;  
      a deposition layer formed at a tip end portion of the rotor blade main body, the deposition layer being formed by using a first electrode composed of a first molded body molded from a powder
- 15       of a cobalt-chromium alloy or a nickel alloy, or the first molded body processed with a heat treatment, generating pulsing electric discharges between the tip end portion of the rotor blade main body and the first electrode in an electrically insulating liquid or gas, and welding a material of the first electrode or a reacting
- 20       substance of the material of the first electrode on the tip end portion of the blade main body by means of energy of the electric discharges; and
- an abrasive coating having abrasiveness formed at a blade pressure side of the deposition layer, the abrasive coating being
- 25       formed by using a second electrode composed of a second molded body molded from a mixed powder including a powder of a metal and a powder of a ceramic or the second electrode processed with a heat treatment, generating pulsing electric discharges between the blade pressure side of the deposition layer and the second
- 30       electrode in an electrically insulating liquid or gas, and welding a material of the second electrode or a reacting substance of the material of the second electrode on the blade pressure side of the deposition layer by means of energy of the electric discharges.
- [2] (amended) A compressor for compressing air applied to a jet engine,
- 35       the compressor characterized by comprising:  
      a titanium compressor case composed of a titanium alloy;

a compressor rotor arranged inside the compressor case, the compressor rotor including plural titanium rotor blades at even intervals and being rotatable around a case axial center of the titanium compressor case,

5           wherein each of the titanium rotor blades includes;

          a rotor blade main body composed of a titanium alloy;

          a deposition layer formed at a tip end portion of the rotor blade main body, the deposition layer being formed by using a first electrode composed of a first molded body molded from a powder  
10   of a cobalt-chromium alloy or a nickel alloy, or the first molded body processed with a heat treatment, generating pulsing electric discharges between the tip end portion of the rotor blade main body and the first electrode in an electrically insulating liquid or gas, and welding a material of the first electrode or a reacting  
15   substance of the material of the first electrode on the tip end portion of the blade main body by means of energy of the electric discharges; and

          an abrasive coating having abrasiveness formed at a blade pressure side of the deposition layer, the abrasive coating being  
20   formed by using a second electrode composed of a solid body of Si, a second molded body molded from a powder of Si, or the second molded body processed with a heat treatment, generating pulsing electric discharges between the blade pressure side of the deposition layer and the second electrode in an electrically  
25   insulating oil, and welding a material of the second electrode or a reacting substance of the material of the second electrode on the blade pressure side of the deposition layer by means of energy of the electric discharges.

[3]   The compressor recited in claim 1 or claim 2, characterized  
30   in that fused portions are respectively generated at a boundary between the deposition layer and the tip end portion of the rotor blade main body and a boundary between the abrasive coating and the deposition layer, in each of the fused portions a composition ratio grading in its thickness direction, the fused portions being  
35   constituted so as to be 3 $\mu$ m or more and 20 $\mu$ m or less in thickness.

[4] (amended) A compressor for compressing air applied to a jet engine,

the compressor characterized by comprising:

a titanium compressor case composed of a titanium alloy;  
a compressor rotor arranged inside the compressor case, the  
compressor rotor including plural titanium rotor blades at even  
5 intervals and being rotatable around a case axial center of the  
titanium compressor case,

wherein each of the titanium rotor blades includes;

a rotor blade main body composed of a titanium alloy; and  
an abrasive coating having abrasiveness formed at a portion  
10 ranging from a blade pressure side to a leading end side of the  
rotor blade main body, the abrasive coating being formed by using  
an electrode composed of a molded body molded from a mixed powder  
including a powder of a metal and a powder of a ceramic or a powder  
of an electrically conductive ceramic, or the electrode processed  
15 with a heat treatment, generating pulsing electric discharges  
between the portion ranging from the blade pressure side to the  
leading end side of the rotor blade main body and the electrode  
in an electrically insulating liquid or gas, and welding a material  
of the electrode or a reacting substance of the material of the  
20 electrode on the portion ranging from the blade pressure side to  
the leading end side of the rotor blade main body by means of energy  
of the electric discharges.

[5] (amended) A compressor for compressing air applied to a jet engine,  
the compressor characterized by comprising:

25 a titanium compressor case composed of a titanium alloy;  
a compressor rotor arranged inside the compressor case, the  
compressor rotor including plural titanium rotor blades at even  
intervals and being rotatable around a case axial center of the  
titanium compressor case,

30 wherein each of the titanium rotor blades includes;

a rotor blade main body composed of a titanium alloy; and  
an abrasive coating having abrasiveness formed at a portion  
ranging from a blade pressure side to a leading end side of the  
rotor blade main body, the abrasive coating being formed by using  
35 an electrode composed of a solid body of Si, a molded body molded  
from a powder of Si, or the molded body processed with a heat treatment,

generating pulsing electric discharges between the portion ranging from the blade pressure side to the leading end side of the rotor blade main body and the electrode in an electrically insulating oil, and welding a material of the electrode or a reacting substance of the material of the electrode on the portion ranging from the blade pressure side to the leading end side of the rotor blade main body by means of energy of the electric discharges.

[6] The compressor recited in claim 4 or claim 5, characterized in that a fused portion is generated at a boundary between the abrasive coating and the deposition layer, in the fused portion a composition ratio grades in its thickness direction, the fused portion being constituted so as to be 3 $\mu$ m or more and 20 $\mu$ m or less in thickness.

[7] The compressor recited in claim 1 or claim 4, characterized in that the ceramic is any one material or any two or more mixed materials from cBN, TiC, TiN, TiAlN, TiB<sub>2</sub>, WC, SiC, Si<sub>3</sub>N<sub>4</sub>, Cr<sub>3</sub>C<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>-Y, ZrC, VC and B<sub>4</sub>C.

[8] A titanium rotor blade applied to a compressor in a jet engine, the titanium rotor blade characterized by comprising:

20 a rotor blade main body composed of a titanium alloy;  
a deposition layer formed at a tip end portion of the rotor blade main body, the deposition layer being formed by using a first electrode composed of a first molded body molded from a powder of a cobalt-chromium alloy or a nickel alloy, or the first molded body processed with a heat treatment, generating pulsing electric discharges between the tip end portion of the rotor blade main body and the first electrode in an electrically insulating liquid or gas, and welding a material of the first electrode or a reacting substance of the material of the first electrode on the tip end portion of the blade main body by means of energy of the electric discharges; and

30 an abrasive coating having abrasiveness formed at a blade pressure side of the deposition layer, the abrasive coating being formed by using a second electrode composed of a second molded body molded from a mixed powder including a powder of a metal and a powder of a ceramic or the second electrode processed with a

heat treatment, generating pulsing electric discharges between the blade pressure side of the deposition layer and the second electrode in an electrically insulating liquid or gas, and welding a material of the second electrode or a reacting substance of the material of the second electrode on the blade pressure side of the deposition layer by means of energy of the electric discharges.

[9] A titanium rotor blade applied to a compressor in a jet engine, the titanium rotor blade characterized by comprising:

a rotor blade main body composed of a titanium alloy;

10 a deposition layer formed at a tip end portion of the rotor blade main body, the deposition layer being formed by using a first electrode composed of a first molded body molded from a powder of a cobalt-chromium alloy or a nickel alloy, or the first molded body processed with a heat treatment, generating pulsing electric discharges between the tip end portion of the rotor blade main body and the first electrode in an electrically insulating liquid or gas, and welding a material of the first electrode or a reacting substance of the material of the first electrode on the tip end portion of the blade main body by means of energy of the electric discharges; and

20 an abrasive coating having abrasiveness formed at a blade pressure side of the deposition layer, the abrasive coating being formed by using a second electrode composed of a solid body of Si, a second molded body molded from a powder of Si, or the second molded body processed with a heat treatment, generating pulsing electric discharges between the blade pressure side of the deposition layer and the second electrode in an electrically insulating oil, and welding a material of the second electrode or a reacting substance of the material of the second electrode on the blade pressure side of the deposition layer by means of energy of the electric discharges.

30 [10] The titanium rotor blade recited in claim 8 or claim 9, characterized in that fused portions are respectively generated at a boundary between the deposition layer and the tip end portion of the rotor blade main body and a boundary between the abrasive coating and the deposition layer, in each of the fused portions

a composition ratio grading in its thickness direction, the fused portions being constituted so as to be 3 $\mu$ m or more and 20 $\mu$ m or less in thickness.

[11] A titanium rotor blade applied to a compressor in a jet engine,  
5 the titanium rotor blade characterized by comprising:

a rotor blade main body composed of a titanium alloy; and  
an abrasive coating having abrasiveness formed at a portion  
ranging from a blade pressure side to a leading end side of the  
rotor blade main body, the abrasive coating being formed by using  
10 an electrode composed of a molded body molded from a mixed powder  
including a powder of a metal and a powder of a ceramic or a powder  
of an electrically conductive ceramic, or the electrode processed  
with a heat treatment, generating pulsing electric discharges  
between the portion ranging from the blade pressure side to the  
15 leading end side of the rotor blade main body and the electrode  
in an electrically insulating liquid or gas, and welding a material  
of the electrode or a reacting substance of the material of the  
electrode on the portion ranging from the blade pressure side to  
the leading end side of the rotor blade main body by means of energy  
20 of the electric discharges.

[12] A titanium rotor blade applied to a compressor in a jet engine,  
the titanium rotor blade characterized by comprising:

a rotor blade main body composed of a titanium alloy; and  
an abrasive coating having abrasiveness formed at a portion  
25 ranging from a blade pressure side to a leading end side of the  
rotor blade main body, the abrasive coating being formed by using  
an electrode composed of a solid body of Si, a molded body molded  
from a powder of Si, or the molded body processed with a heat treatment,  
generating pulsing electric discharges between the portion ranging  
30 from the blade pressure side to the leading end side of the rotor  
blade main body and the electrode in an electrically insulating  
oil, and welding a material of the electrode or a reacting substance  
of the material of the electrode on the portion ranging from the  
blade pressure side to the leading end side of the rotor blade  
35 main body by means of energy of the electric discharges.

[13] (amended) The titanium rotor blade recited in claim 11 or claim

12, characterized in that a fused portion is generated at a boundary between the abrasive coating and the rotor blade main body, in the fused portion a composition ratio grades in its thickness direction, the fused portion being constituted so as to be 3 $\mu$ m or more and 20 $\mu$ m or less in thickness.

[14] The titanium rotor blade recited in claim 8 or claim 11, characterized in that the ceramic is any one material or any two or more mixed materials from cBN, TiC, TiN, TiAlN, TiB<sub>2</sub>, WC, SiC, Si<sub>3</sub>N<sub>4</sub>, Cr<sub>3</sub>C<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, ZrO<sub>2</sub>-Y, ZrC, VC and B<sub>4</sub>C.

10 [15] A compressor characterized by comprising the titanium rotor blade recited in any claim from claim 8 to claim 14.

[16] A jet engine characterized by comprising the compressor recited in any claim of from claim 1 to claim 7 and claim 15.

15 [17] A production method of a titanium rotor blade for producing the titanium rotor blade from a rotor blade main body composed of a titanium alloy, the production method of the titanium rotor blade characterized by producing the titanium rotor blade from the rotor blade main body, by:

forming a deposition layer at a tip end portion of the rotor  
20 blade main body by using a first electrode composed of a first molded body molded from a powder of a cobalt-chromium alloy or a nickel alloy, or the first molded body processed with a heat treatment, generating pulsing electric discharges between the tip end portion of the rotor blade main body and the first electrode  
25 in an electrically insulating liquid or gas, and welding a material of the first electrode or a reacting substance of the material of the first electrode on the tip end portion of the blade main body by means of energy of the electric discharges; and

forming an abrasive coating having abrasiveness at a blade  
30 pressure side of the deposition layer by using a second electrode composed of a second molded body molded from a mixed powder including a powder of a metal and a powder of a ceramic or the second electrode processed with a heat treatment, generating pulsing electric discharges between the blade pressure side of the deposition layer  
35 and the second electrode in an electrically insulating liquid or gas, and welding a material of the second electrode or a reacting



substance of the material of the second electrode on the blade pressure side of the deposition layer by means of energy of the electric discharges.